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MOCKUP NO. 20, ANTENNA RADIATION PATTERN PROJECT APOLLO SPACECRAFT

(U)

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Approved by

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NORTH AMERICAN AVIATION, INC.
SPACE and INFORMATION SYSTEMS DIVISION

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This issue of Specification SID 62-268, dated 15 May 1962, is a preliminary-type specification: however, it supersedes any previous issue of SID 62-268.

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1. SCOPE

1.1 Scope.- This specification covers the requirements for Mockup No. 20, the Antenna Radiation Pattern for the Project Apollo Spacecraft. The mockup will be used to conduct full-scale antenna pattern measurements.

2. APPLICABLE DOCUMENTS

2.1 Applicability.- The following document forms a part of this specification:

PUBLICATIONS

United States Air Force

ARDCM 80-1, Volume I	Handbook of Instructions for Aircraft Designers

3. REQUIREMENTS

3.1 Mockup Configuration.- The mockup No. 20 configuration shall simulate an operational spacecraft, for antenna pattern testing purposes. The complete mockup shall consist of the launch escape system and the command module.

3.1.1 Launch Escape System.- The simulated launch escape system shall consist of the following components, simulated to the degree that they affect antenna patterns:

(a) launch escape tower
(b) rocket nozzles
(c) aerodynamic skirt

3.1.2 Command Module.- The simulated command module shall consist of the following components, simulated to the degree that they affect antenna patterns:

(a) ablative material
(b) air lock
(c) reaction control rockets
(d) periscope
(e) telescope
(f) snorkels
(g) ingress/egress hatches

(To be submitted at a later date)

FIGURE 1

(h) windows and viewing ports
(i) antennas.

3.2 Construction. - Materials and processes used in the construction of the mockup shall insure mechanical, physical, and electrical similarity to an operational spacecraft to the extent required for antenna pattern tests. Simulation of components required for the mockup shall be subject to North American Aviation, Inc., Space and Information Systems Division (NAA/SID) engineering approval. U.S. Air Force Handbook ARDCM 80-1, Volume I, shall be used for guidance and reference in the design and construction of the mockup.

3.2.1 Launch Escape System. - The launch escape tower, rocket nozzles, and aerodynamic skirt shall be constructed of aluminum. The tower shall be detachable from the command module.

3.2.2 Command Module. - The outer metallic skin of the simulated command module shall conform to the outer metallic mold line. The electrical conductivity of the material used shall closely approximate that of an operational spacecraft. The module shall be constructed to withstand cantilevering forces generated by supporting the entire mockup from the heat shield on the longitudinal axis.

3.2.2.1 Ablative Material. - The material used to simulate the ablator shall conform to the ablative mold line and shall electrically simulate the ablative material. The material shall be removable.

3.2.2.2 Parachute Compartment Shroud. - The parachute compartment shroud shall be removable.

3.2.2.3 Air Lock. - The air lock shall be constructed of aluminum. The air lock dome shall be operable.

3.2.2.4 Parachute Compartment Deck. - The parachute compartment deck shall be constructed of aluminum.

3.2.2.5 Nose Cone Hatch. - The nose cone hatch shall be operable.

3.2.2.6 Reaction Control Rockets. - The reaction control rockets shall be physically and electrically simulated.

3.2.2.7 Periscope. - The periscope shall be physically and electrically simulated. The periscope shall be constructed so that the stowed and operating positions are simulated.

3.2.2.8 Telescope.- The telescope shall be physically and electrically simulated: both the stowed and operating positions shall be simulated.

3.2.2.9 Snorkels.- When snorkels are required, they shall be physically and electrically simulated: both the stowed and operating positions shall be simulated.

3.2.2.10 Ingress/Egress Hatches.- Command module ingress/egress hatches shall be physically and electrically simulated.

3.2.2.11 Windows and Viewing Ports.- The simulated command module shall contain all window and viewing ports.

3.2.2.12 Antennas and Antenna Mountings.- Antenna mountings shall be provided for all simulated command module antennas. All antennas will be provided by NAA/SID.

3.2.2.13 Weight.- The weight of the command module mockup shall not exceed 500 pounds.

3.2.2.14 Access.- The simulated command module shall have access provisions so that the antennas and cabling can be mounted from inside the mockup.

3.3 Performance.- The mockup shall be used to conduct full-scale antenna measurements. The antenna measurements shall provide a means for determining and evaluating the pattern coverage, impedance, and cross-coupling between the spacecraft antennas.

4. QUALITY ASSURANCE PROVISIONS

(Not applicable)

5. PREPARATION FOR DELIVERY

5.1 Mockup Delivery.- The mockup shall be delivered to an NAA/SID-specified subcontractor. Ground handling equipment shall be provided to transport and handle the mockup without damaging it.

6. NOTES

6.1 Intended Use.- The mockup is intended to be used for full-scale antenna pattern and impedance measurements to ascertain effectiveness of the ablative material, telescopes, command module configurations, and component arrangement.